been found bearing evidence of having been cut or perforated by instruments belonging to the polished stone age. M. Broca, in describing the crania submitted to his notice by M. Prunières, draws attention to a similar condition in a skull sent to him by Mr. Squier, and taken by the latter from an ancient Peruvian tomb, in which a square opening had been made, evidently by a saw, and probably a few days before death; and he mentions that among the Kabyles and other African tribes trepanning is resorted to in the present day for comparatively unimportant diseases, while Hippocrates refers to the process as one established in his time among the Greeks. M. Broca does not, however, assume that cranial perforations among primitive races in Europe had any connection with surgical processes, but is rather disposed to assume them to have been the result of certain obligations of religion.—M. J. de Baye describes circumstantially the caverns and recesses, amounting to more than one hundred, which he has recently discovered and explored in the Valley de Petit-Morin, in Marne.—M. Bertrand has presented the Society with a cast of a reindeer horn, on which is distinctly traced with a flint instrument the figure of a reindeer grazing, which was found at Thaïnghen, near Lake Constance.—MM. de Quatrefages and Hamy, in offering their colleagues the second edition of their great work on "Crania Ethica," which is entirely devoted to the consideration of the Cro-Magnon race, entered into an exposition of their views in regard to the relations existing between the Troglodytes of Perigord and certain southern races, including not only the Basques, but Kabyle tribes from the Beni-Menasser and Djurjura regions.

SOCIETIES AND ACADEMIES

LONDON

Mathematical Society, May 13.—Prof. Cayley, F.R.S., vice-president, in the chair.—The Rev. C. Taylor read a paper on some constructions for transforming curves and surfaces. The basis of the paper was a neglected work on conic sections, "which for originality and thoroughness is in its own special department unsurpassed." The author was G. Walker, F.R.S., of Nottingham, and his work appeared in 1794. The tediousness of the style may account for the fact that the work was not appreciated. Dr. Hirst and the Chairman made some remarks on the paper.—Mr. J. W. L. Glaisher communicated some notes on Laplace's coefficients.—A short paper by Mr. Harry Hart, on a linkwork for describing sphero-conics and sphero-quartics, was taken as read.

Chemical Society, May 20.—Prof. Abel, F.R.S., president, in the chair.—Mr. A. H. Smee read some notes on milk in health and disease. From the results of numerous experiments he finds that when cows are fed on sewage grass alone the milk soon goes putrid, and the butter made from it is soft, and rapidly becomes rancid. He also noticed the outbreaks of typhoid which had occurred in various places owing to sewage water having been used to cleanse the dairy utensils or to reduce the quality of rich milk to the lowest standard permitted by law. A long and interesting discussion followed, after which Mr. W. H. Deering read a paper on some points in the examination of waters by the ammonia method, in which he proposes certain modifications to facilitate the application of the Nessler test and eliminate incidental errors. There was also a communication from Prof. H. Howe on some Nova Scotian Triassic Trap minerals.

Geological Society, May 12.—John Evans, V.P.R.S., president, in the chair.—The following communications were read.—Notes on the occurrence of *Eozoon canadense* at Côte St. Pierre, by Principal Dawson, F.R.S. The author commenced by describing the arrangement and nature of the deposits containing *Eozoon* at the original locality of Côte St. Pierre on the Ottawa River. The Eozoal limestone is a thick band between the two great belts of gneiss which here form the upper beds of the Lower Laurentian. *Eozoon* is abundant only in one bed about four feet thick; but occasional specimens and fragments occur throughout the band. The limestone contains bands and concretions of serpentine, and is traversed by veins of chrysolite; the former an original part of the deposit, the latter evidently of subsequent formation. A thin section, 5½ inches in depth, showed: (1) Limestone with crystals of dolomite and fragments of *Eozoon*; (2) Fine-grained limestone, with granules of serpentine, casts of chamberlets of *Eozoon* and of small Foraminifera; (3) Limestone with dolomite, and containing a thin layer of serpentine; (4) Limestone and dolomite with grains of serpentine and fragments of supplemental skeleton of *Eozoon*; (5) Crystallised dolomite, with a few fragments of *Eozoon* in the state of calcite; (6) Limestone containing serpentine, as No. 2. The author criticised some of the figures and statements put forward by Messrs. King and Rowney, and noticed two forms of *Eozoon*, which he proposed to regard as varieties, under the names of *minor* and *acervulina*. He stated that fragments of *Eozoon*, included in dolomitic limestones, have their canals filled with transparent dolomite, and sometimes in part with calcite. In one specimen a portion was entirely replaced by serpentine. The author called particular attention to the occurrence of serpentinous casts of chamberlets, single or arranged in groups, which resemble in form those of the Globigerine Foraminifera. These may belong either to separate organisms or to the acervuline layer of the *Eozoon*; the author proposes to call them *Archæospherinæ*, and describes them as having the form and mode of aggregation of *Globigerina*, with the proper wall of *Eozoon*. The author discussed the extant theories as to the nature of *Eozoon*, and maintained that only that of the infiltration of the cavities of Foraminiferal structure with serpentine is admissible. He particularly referred to the resemblance of weathered masses of *Eozoon* to Stromatoporoid corals. —Remarks upon Mr. Mallet's theory of volcanic energy, by the Rev. O. Fisher, F.G.S. Mr. Mallet's paper, read before the Royal Society in 1872, was discussed by the author *seriatim* as far as it seemed open to criticism. With respect to the condition of the earth's interior, whether it be rigid or not, Sir W. Thomson's arguments for rigidity were referred to, and geological difficulties in accepting his conclusions suggested. Mr. Mallet's views regarding the formation of oceanic and continental areas, that they have on the whole occupied nearly the same positions on the globe at all periods from the very first, were objected to on the ground that all continental areas with which we are acquainted are formed of water-deposited rocks, and that therefore those areas must at some time have been sea-bottoms; and if these wide features have not occupied the same positions which they now do from the very first, Mr. Mallet's explanation fails, that they were caused by unequal contraction when the crust was first permanently formed and thin. It was also shown that the theory of unequal *radial* contraction cannot account for the difference of elevation between continental and oceanic areas upon reasonable assumptions. For if we consider the crust to have been 400 miles thick (which cannot be considered *thin*), and to have cooled from 4000° F. to zero (a most extravagant supposition), then, if the crust had contracted one-tenth more beneath the oceanic area than it had done beneath the continental, we should only get a depression of one mile for the oceanic area, using Mr. Mallet's mean coefficient of contraction. The main feature of Mr. Mallet's theory was then discussed, viz., that "the heat, from which terrestrial volcanic energy is at present derived, is produced locally within the solid shell of our globe, by transformation of the mechanical work of compression or crushing of portions of that shell, which compressions and crushings are themselves produced by the more rapid contraction by cooling of the hotter material of the nucleus beneath that shell, and the consequent more or less free descent of the shell by gravitation, the vertical work of which is resolved into tangential pressures and motion within the shell." Mr. Mallet's mode of estimating the amount of heat derivable from crushing a cubic foot of rock was explained, and it was accepted as a postulate, that the heat developed by crushing one cubic foot of rock would be sufficient to fuse 0·108 of a cubic foot of rock; or, in other words, that it would require nearly the heat developable by crushing ten volumes to fuse one. Mr. Mallet considers that the heat so developed may be localised. But Mr. Fisher inquires why, since the work is distributed equally with the crushing, the heat should not be so also; and, since no cause can be assigned why one portion of the crushed portion of rock should be heated more than the rest, assumes that all which is crushed must be heated equally. In short, he is of opinion that if Mr. Mallet's theory were true, the cubes experimented upon ought to have been themselves fused. After paying a just tribute of admiration to Mr. Mallet's elaborate and highly important experiments upon the fusion and subsequent contraction of slags, the author remarked upon Mr. Mallet's estimate of the probable contraction from cooling of the earth's dimensions, showing that it had been based on untenable assumptions. (The author of the paper, however, holds that the contraction of the dimensions of the globe has been greater than *mere* cooling will account for.) Upon the concluding portions of Mr. Mallet's paper, in which

he estimates that the amount of energy afforded by the crushing of the solid crust would be sufficient to account for terrestrial vulcanicity, some strictures were made; but it was held that, if the main proposition had not been proved, these calculations were not of essential importance.

Meteorological Society, May 19.—Dr. R. J. Mann, president, in the chair.—The following papers were read:—On some practical points connected with the construction of lightning conductors, by Dr. R. J. Mann. This paper dealt especially with the material and dimensions of conductors, the nature and influence of points, the essentials of earth contacts, connection with metallic masses forming a part of the construction of buildings, the power of induction in producing return shocks, the dangerous action of metal chimney-pots upon unprotected chimney shafts, and the facility with which houses may be efficiently protected when the defence is made part of the original design of the architect. The conditions which were finally insisted upon as indispensable to efficiency of protection were:—1. Ample dimension and unbroken continuity in the lightning rod. 2. Large and free earth contacts, with frequent examination by galvanometers of the condition of these to prove that they are not in process of impairment through the operation of chemical erosion. 3. The employment of sufficient points above to dominate all parts of the building. 4. The addition of terminal points to the conducting system wherever any part of the structure of the building comes near to the limiting surface of a conical space having the main point of the conductor for its height, and a breadth equal to twice the height of that point from the earth for the diameter of its base. 5. The avoidance of all less elevated conducting divergencies within striking distance of the conductor, and especially such dangerous divergencies of this character as gas-pipes connected with the general mains, and therefore forming good earth contacts.—On certain small oscillations of the barometer, by the Hon. Ralph Abercromby. These small oscillations of the barometer (sometimes called "pumping") have long been associated with gusts of wind, but the precise nature of their action has not been determined. The author gives two examples as typical:—1. Window looking S., wind nearly S., in strong gusts. In this case the first motion of the barometer was always upwards about 0·01 inch, as if the effect of the wind being arrested by the house was to compress the air in the room. 2. A corner house, one window to S., another to W., wind S. in strong gusts. With the W. window open there were violent oscillations, but in this case the first motion was always downwards. On opening the S. window as well, the pumping ceased. The explanation seems to be, that the wind blowing past the W. window drew air out of the room, but when the S. window was opened as much air came in as was drawn out, and the pumping ceased. It is well known to medical men that many acute diseases are aggravated by strong winds; and the author has observed this distress to be associated with the pumping of the barometer. He suggests the following practical methods of palliation:—If windows can be borne open, try by crossing, or otherwise altering the drafts, to diminish the distress. When, as in most cases, windows cannot be open, all doors and windows should be closely shut, as well as the vent of the chimney, if there is no fire; and, if possible, the patient should be moved to a room on the lee side of the house.—Proposed modification of the mechanism at present in use for reading barometers so that the third decimal place may be obtained absolutely, by Mr. R. E. Power.

PARIS

Academy of Sciences, May 10.—M. Frémy in the chair.—The following papers were read:—On the substitution by approximation within determined limits of the relation of variables of a homogeneous function to two variables of another homogeneous function of the same degree, by M. H. Resal.—A letter by M. Faye, on the distribution of temperature on the sun's surface and the recent measurements of M. Langley.—Observations on the Pandaneæ of New Caledonia, by M. A. Brogniart.—On a locomotive on stilts instead of wheels, by M. Tresca.—On a law connected with the work performed by steam-engines, by M. A. Ledieu.—The President then welcomed M. Fleuriais, the chief of the party of observers sent to Pekin to observe the Transit of Venus. M. Fleuriais then read a detailed description of the work done by the expedition and of the journey, which was accompanied by many difficulties.—Observations on the epoch of disappearance of the ancient fauna of Rodrigues Island, by M. Alph. Milne-Edwards.—Memoir on the formulæ of perturbation, by M. E. Mathieu.—On some properties of algebraic curves, by M. Laguerre.—On the toxicological effects of the bark of *Mancône*, by MM. Gallois and Hardy.—On observations made with different Phylloxera, by M. Lichtenstein.—The Minister for Public Instruction transmitted to the Academy a letter, dated Capetown, Feb. 22, 1875, from M. Lanen, and containing interesting data regarding the fauna and the flora of the Kerguelen Islands. These data are due to the observations made by Dr. Kidder, a naturalist who was attached to the Transit of Venus party sent to those islands by the United States.—A note by M. Garnier, on the use of glycerine in the treatment of glycosuria.—On the theory of storms, a reply to M. Faye, by M. Peslin.—On the presence of sulphuric anhydride in the gaseous products of the combustion of iron pyrites; note by M. A. Scheurer Kestner.—On the quaternary lignites of Jarville, near Nancy, by M. P. Fliche.—M. d'Abbadie then spoke on the first results of observations made by M. de Rossi, on the microscopical movements of freely-suspended pendula.—M. Virlet d'Aoust, in relation to the recent catastrophe with the *Zenith* balloon, pointed out the danger in the quick passage through strata of air of variable densities.

May 17.—M. Frémy in the chair.—The following papers were read:—Meridian observations of the minor planets, made at the Observatories of Greenwich and Paris during the first quarter of 1875. The planets observed were the following:—1, 46, 49, 59, 33, 24, 67, 15, 18, 94, 103, 109, 134, 7, 124, 25, 47, 53, 54, 73, 84, and 101. This communication was made by M. Leverrier.—Observations by M. Leymerie, on a note of M. Trutal relating to a Pliocene deposit in the Eastern Pyrenees.—On the swimming-bladder of *Caranx trachurus*, and on the hydrostatic function of that organ, by M. A. Moreau.—On chemical and physiological ferments, by M. A. Müntz.—Experiments and observations relating to glutinous fermentation, by M. A. Baudrimont.—A note by M. de Tastes, on the theory of cyclones.—Anatomical, physiological, and pathological researches on the human ovum in its relation to the diseases of the fœtus, by M. G. J. Martin Saint-Ange.—Observations of the moon and of moon culminating stars, made at Melbourne Observatory, by Mr. Robert Ellery (communicated by M. Leverrier).—On mercury-cataracts, by M. C. Decharme.—A note by M. de Fonvielle, on the precautions to be used when making balloon ascents to a great height.

BOOKS AND PAMPHLETS RECEIVED

FOREIGN.—Zeitschrift für Wissenschaftliche Zoologie: Carl Theodor von Siebold, Albert von Kolliker, und Ernest Ehlers (Leipzig, W. Engelmann).—Jahrbücher für Wissenschaftliche Botanik: Dr. N. Pringsheim (Leipzig, W. Engelmann).—Recherches sur les Phénomènes de la digestion chez les Insectes: Felix Plateau (Bruxelles, F. Hayez).—Le Scoperte del Fusinieri. Influence de la pression de l'air sur la vie de l'homme. 2 vols.: D. Jourdanet (Paris, G. Masson).—Der Venusmond und die Untersuchungen über die früheren Beobachtungen dieses Mondes: Dr. F. Schorr (Braunschweig, Friedrich Vieweg und Sohn).—Etudes Premières et Secondes sur les seiches du lac Léman: F. A. Forel (Lausanne, Rouge et Dubois).—Repertorium für Meteorologie: Dr. H. Wild (Russia).—Annales de l'observatoire Physique Central de Russie: Dr. H. Wild (Russia).—Traversée du Dêtroit par le Capitaine P. Boyton. (Boulogne-sur-Mer, Charles Aigre).

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